भारतीय मानक
Indian Standard

IS 16347 : 2015
(Reaffirmed 2019)

भूकृत्रिम — भूवस्त्रादि की स्थिरता पर तापमान के प्रभाव के लिए परीक्षण की विधि

Geosynthetics — Method of Test for Effects of Temperature on Stability of Geotextile

ICS 59.080.70

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July 2015 **Price Group 2**

Geosynthetics Sectional Committee, TXD 30

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Geosynthetics Sectional Committee had been approved by the Textile Division Council.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GEOSYNTHETICS — METHOD OF TEST FOR EFFECTS OF TEMPERATURE ON STABILITY OF GEOTEXTILE

1 SCOPE

1.1 This standard specifies a procedure for determining the effects of climatic temperature on the strength properties of geotextile.

1.2 The effect of temperature on the stability of geotextiles is reported as the change in tensile strength and elongation between tests performed on controlled samples and on the samples under conditions at which the geotextile is expected to perform in the field.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

IS No.	*Title*
1969 (Part 1) : 2009	Textiles — Tensile properties of fabrics — Determination of maximum force and elongation at maximum force: Part 1 Strip method (*third revision*)
6359 : 1971	Method for conditioning of textiles
13321 (Part 1) : 1992	Glossary of terms for geosynthetics: Part 1 Terms used in materials and properties
SP 45 : 2014	Handbook on glossary of textile terms

3 PRINCIPLE

During shipping and storage, the geotextile may be exposed to abnormal temperatures. The fabric could be tested at these temperatures to determine the detrimental effects of these conditions on the strength properties. In view of this, specimens of a geotextile are conditioned at selected temperatures in an environmental chamber attached to a tensile testing machine; tensile tests are conducted as control under the standard laboratory test conditions. Tensile strength and percent elongation properties obtained at various test temperatures are recorded. Changes in strength characteristics due to the effects of temperature are determined. The temperatures used for conditioning and testing the geotextiles are the temperatures at which the geotextile will perform or are typically exposed to in the field.

4 APPARATUS

4.1 Tensile Testing Machine, of the constant rate-of-extension (CRE) or constant rate-of-traverse type with automatic recorder.

4.2 Environmental Chamber, capable of maintaining a temperature range from –40 to + 100°C and equipped with temperature regulation capable of maintaining the test temperature within ± 2°C inside the chamber.

4.3 Thermometer, capable of measuring the temperature range within which tests are being performed and graduated in a 1°C division scale.

5 PREPARATION OF TEST SPECIMEN

5.1 Laboratory Sample

Take for the laboratory sample, a swatch extending the width of the fabric and approximately 1 m along the selvage from each roll in the lot sample. The swatch may be taken from the end portion of a roll provided there is no evidence that it is distorted or different from other portions of the roll. In cases of dispute, take a swatch that shall exclude fabric from the outer wrap of the roll or the inner wrap around the core.

5.2 Test Specimens

For the standard conditions and for each test temperature to which the geotextile is to be exposed, cut five specimens at least 50.8 mm wide by 152.4 mm long from each swatch in the laboratory sample with the long dimension of the specimens parallel to the length-wise direction. Cut five specimens of the same size from each swatch in the laboratory sample with the long dimension of the specimen parallel to the width-wise direction.

6 PROCEDURE

6.1 Secure a specimen in the jaws inside the chamber.

6.2 Adjust the temperature of the environmental chamber as required.

6.3 Condition the specimen to the required temperature. The flow of gas is automatically controlled by a solenoid valve. The valve opens and closes to let the gas in to keep constant temperature in the chamber.

6.4 Perform 50 mm cut or 50 mm ravel strip (depending upon the geotextile) tensile test in accordance with IS 1969 (Part 1) using a machine speed of 305 ± 10 mm/min.

6.5 Repeat the test sequence till **6.4**.

6.6 Adjust the temperature of the environmental chamber and test a second group of specimens at any other required temperature. Repeat the test sequence of **6.1** to **6.4**.

6.7 Test five control samples for each direction at standard laboratory test conditions.

7 CALULATION

7.1 Determine the tensile strength and apparent elongation for all specimens.

7.2 Calculate the average tensile strength and average elongation at each test temperature for both the machine direction (warp) and cross-machine direction (fill) specimens.

7.3 Calculate the percent change in tensile strength and elongation for each test temperature, as follows:

$$C = \frac{B}{A} \times 100$$

where

C = change in tensile strength or elongation, percent;

A = average tensile strength or elongation for control specimens conditioned and tested in the standard atmosphere for testing geotextiles, and;

B = average tensile strength or elongation for specimens conditioned and tested at a specific test temperature.

8 REPORT

The report shall include the following:

a) State that the tests were performed as directed in this test method. Describe the material(s) or products(s) sampled and the method of sampling used.

b) Report the following information for each sample:
   1) Test temperatures,
   2) The average breaking load and average percent apparent elongation for each direction at each test temperature,
   3) The temperature stability for tensile strength and for elongation at each of the test temperatures, and
   4) Plots of average breaking load and percent apparent elongation *versus* test temperature for each direction.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Geosynthetics Sectional Committee, TX 30

Organization	*Representative(s)*
The Bombay Textile Research Association, Mumbai	Dr A. N. Desai (***Chairman***) Shri V. K. Patil (*Alternate*)
Business Coordination House, New Delhi	Shri Samir Gupta Shrimati Ritika Gupta (*Alternate*)
Central Road Research Institute, New Delhi	Shri Sudhir Mathur Shri Jai Bahagwan (*Alternate*)
Central Soil and Materials Research Station, New Delhi	Shri Nripendra Kumar Shri Manish Gupta (*Alternate*)
CIDCO, Mumbai	Representative
Coir Board, Kochi	Dr U. S. Sarma Shri M. Kumaraswamy Pillay (*Alternate*)
Department of Jute and Fibre Technology, Kolkatta	Dr Swapan Ghosh Shri K. R. Gupta (*Alternate*)
Directorate General of Supplies and Disposals, New Delhi	Additional Director General (QA)
E. I. Dupont India Pvt Ltd, Gurgaon	Shri R. Ganesh Shrimati Vedika Kapoor (*Alternate*)
Ganga Flood Control Commission, Patna	Shri S. Masood Husain Shri Ravi Bhushan Kumar (*Alternate*)
Garware Wall Ropes Ltd, Pune	Shri Tirumal Kulkarni Shri S. J. Chitnis (*Alternate*)
Gujarat Engineering Research Institute, Vadodara	Shri L. V. Ashara Research Officer (*Alternate)*
Indian Jute Industries' Research Association, Kolkata	Shri P. K. Choudhury Shri Koushik Das (*Alternate*)
Indian Jute Manufacture Association, Kolkatta	Representative
Jaya Shree Textiles, Hooghly	Shri Pawan Sharma
Kusumgar Corporates, Mumbai	Shri Y. K. Kusumgar Dr M. K. Talukdar (*Alternate*)
Macaferri Environmental Solutions Pvt Ltd, Navi Mumbai	Dr Ratnakar Mahajan
Maharashtra Maritime Board, Mumbai	Representative
National Highways Authority of India, New Delhi	Shri R. K. Gandhi Shri R. P. Singh (*Alternate*)
National Jute Board, Kolkatta	Shri T. Sanyal Shri A. K. Khastagir (*Alternate*)
Office of the Textile Commissioner, Mumbai	Shri Ajay Pandit Shri M. Baluchamy (*Alternate*)
Premier Polyfilms Ltd, Ghaziabad	Dr Sanjeev K. Verma Shri Harinder Kumar (*Alternate*)
Reliance Industries Ltd, New Delhi	Shri M. S. Verma Shri V. Ravikanth (*Alternate*)
Strata Geosystems (I) Pvt Ltd, Mumbai	Shri Narendra Dalmia Shri Shahrokh Bagli (*Alternate*)
Supreme Nonwovens Pvt Ltd, Hyderabad	Shri C. K. Chaudhuri Shri C. K. Jain (*Alternate*)
Techfab India, Mumbai	Shri Anant Kanoi Dr Saurabh Vyas (*Alternate*)

Organization	*Representative(s)*
The Synthetics & Art Silk Mills Research Association, Mumbai	Dr Manisha Mathur Shrimati Ashwini Sudam (*Alternate*)
Urja Products Pvt Ltd, Ahmedabad	Shri Janak Nanavaty
Veermata Jijabai Technological Institute, Mumbai	Shri S. P. Borkar
BIS Directorate General	Shri Prabhakar Rai, Scientist 'E' and Head (TXD) [Representing Director General (*Ex-officio*)]

Member Secretary
Shri J. K. Gupta
Scientist 'C' (TXD), BIS

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